

ABSTRACT

When elemental iron is in the presence of chlorinated compounds (contaminants) a naturally occurring reaction takes place and the chlorinated compounds are reduced and form harmless compounds. The production of extremely small metal particles containing elemental iron or a mixture of elemental iron and a second metal is imperative to this method of treating contaminants and is the subject of the present invention. When the particle is made small enough a surfactant is not required for the particle to do its job. The elemental metal may be kept in an elemental state by keeping it in an oxygen-scavenging environment. This is achieved by either suspending the nanoscale metal in a carbohydrate solution or by injecting a carbohydrate solution in atomized form into the gas used to inject the metal into the subsurface soil. Additionally, the present invention is to a method of using elemental metal to reductively dehalogenate halogenated hydrocarbons, to reduce soluble metals and to treat metalloids in subsurface soil.